

***RIPARIAN AND WETLAND INVENTORY AND  
HEALTH ASSESSMENT ON ROBB CREEK AND  
LEDFORD CREEK IN THE ROBB/LEDFORD  
WILDLIFE MANAGEMENT AREA***

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**January 2006**



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## EXECUTIVE SUMMARY

During the summer of 2005 Bitterroot Restoration, Inc. (BRI) conducted riparian inventory along 6.8 miles of stream on reaches of Robb Creek (2.9 miles) and Ledford Creek (3.9 miles) within the Robb/Ledford Wildlife Management Area. This was a re-inventory of reaches previously done in 1999. The purpose was to assess the nature and extent of any change that might have occurred since that time. During the intervening six years, general riparian health on Robb Creek is found to have declined, while that along Ledford Creek has improved. Table 1 compares the summary statistics of riparian health status along these two streams from the two assessments. Both streams, however, currently remain in the general category “Functional, At Risk (healthy, but with problems).” Both streams still have tremendous potential for improvement.

**Table 1.** Summary of riparian health change on Robb Creek and Ledford Creek as an average along each stream (Values given in percent ratings, where 100 percent would represent perfect health.)

Creek	Year	Vegetation	Physical	Overall Overall Category <sup>1</sup>
Robb	1999	68	87	78 FAR
Robb	2005	61	76	70 FAR
Ledford	1999	52	52	52 NF
Ledford	2005	63	67	65 FAR

<sup>1</sup> **Categories:**

PFC (Proper Functioning Condition) = score rating from 80 to 100 percent

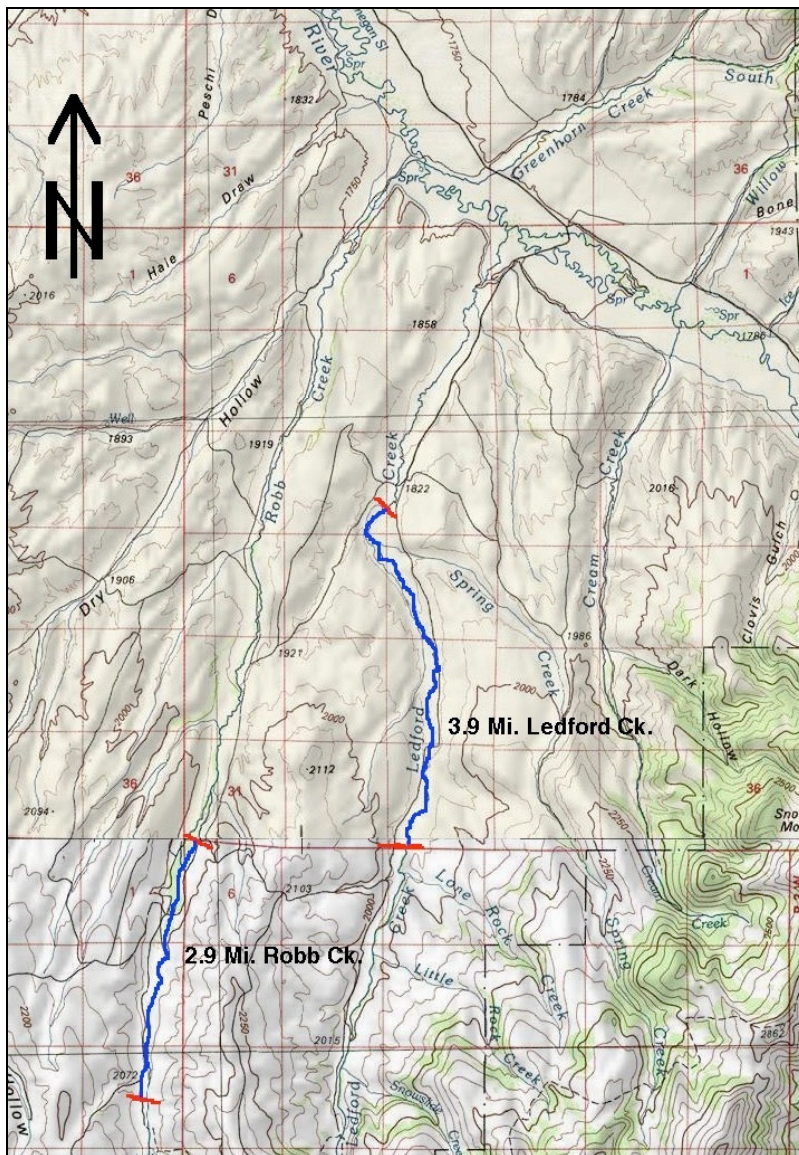
FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent

NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

Over the six years there has been good improvement on overall vegetation cover of the riparian zone on Robb Creek, including improvements in preferred tree and shrub species regeneration and in browse utilizations rates of these species. However, these gains are more than offset by increases in the amount of invasive species (weeds) and undesirable herbaceous species present. On the physical side of the assessment, Robb Creek has seen considerable decline since 1999. Channel incisement and human caused alterations to both the banks and to the rest of the riparian zone have more than offset modest improvements in rootmass protection of the banks and in the amount of human caused bare ground. Ledford Creek shows significant improvement on both vegetation and physical factors. Strong improvements were recorded in overall vegetation cover, preferred tree and shrub regeneration, streambank rootmass protection, amount of bare ground, and the amount of human caused bank alteration. As on Robb Creek, major negative factors on Ledford Creek are increased presence of invasive species and channel incisement.

## INTRODUCTION

In 1999 several streams within the Robb/Ledford Wildlife Management Area (RLWMA) were inventoried for lotic riparian conditions. Among these were Robb Creek (2.9 miles) and Ledford Creek (3.9 miles) (Figure 1) near the boundary between the RLWMA and Turner Enterprises private property. During early August of 2005 Bitterroot Restoration, Inc. (BRI) repeated the inventory along the reaches of Robb Creek and Ledford Creek that was first done in 1999. The purpose was to assess the nature and extent of any change that might have occurred since that time. Both Robb Creek and Ledford Creek are perennial streams within active grazing pastures.

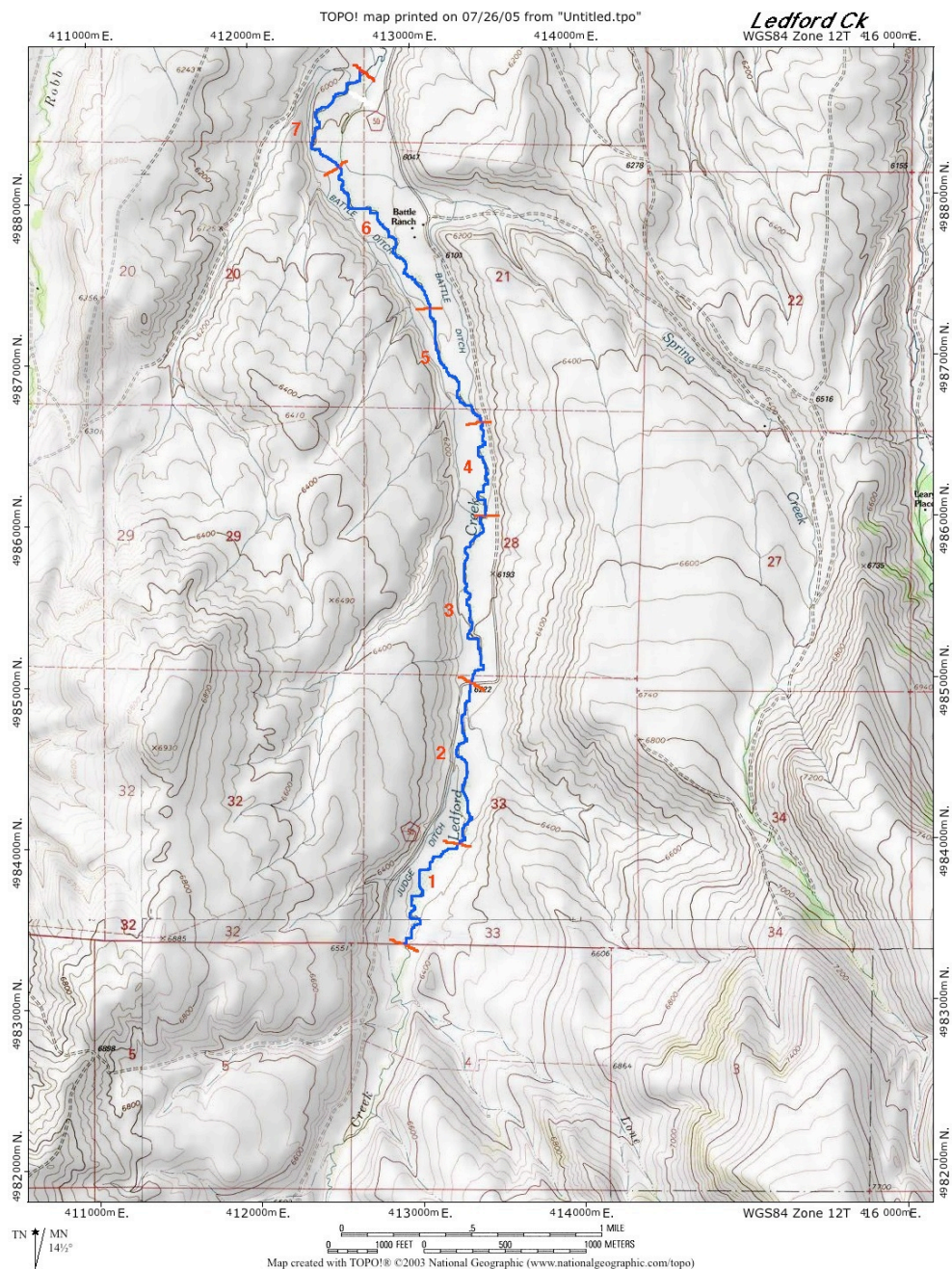


**Figure 1.** Overview map of Robb Creek and Ledford Creek vicinity, showing location of reaches inventoried



## SUMMARY OF LOTIC INVENTORY AND HEALTH ASSESSMENT ON LEDFORD CREEK

In early August of 2005 BRI conducted follow-up lotic riparian inventory on 7 polygons on Ledford Creek, a perennial stream in sections 17, 21, 28, and 33 of township 9S, range 4W (Figures 2 and 3). Elevation on this reach of Ledford Creek ranges from approximately 6,300 feet at the upper end down to approximately 5,985 feet at the lower end. This reach of stream had previously been inventoried six years earlier in 1999 and found to be in nonfunctional condition (unhealthy) at that time. In the intervening six years, the riparian health of Ledford Creek has improved well into the Functional, at Risk (healthy, but with problems) category.



**Figure 2.** Topographic map of Ledford Creek showing sampled polygon locations





**Figure 3.** Overview of Ledford Creek showing riparian zone strip and wide, sub-irrigated pasture bottom

Although the same length of stream was inventoried (3.9 miles) again in 2005, the average riparian zone width was estimated much wider in this latter inventory. The riparian zone area included in all seven polygons on Ledford Creek was estimated in 1999 as 15.5 acres. The riparian zone area in 2005 was estimated at 48.3 acres. Although the estimation of width made in 1999 appears to have been low, certain kinds of riparian degradation can result in a narrowing of the riparian zone, and the healing process can widen it again. This process usually involves the lowering and raising again of the water table, so often with the help of beaver. That has been the case on Ledford Creek, where the average riparian zone width was 33 feet in 1999. In 2005 the average riparian zone width had increased to 102 feet, accompanied with a dramatic increase in active beaver presence (Figure 4).



**Figure 4.** Beaver dam on Ledford Creek in 2005 showing raised elevation of water level

## **Vegetation**

The total number of plant species observed on the Ledford Creek riparian zone has increased since 1999 from 69 (including one tree species, 14 shrub species, 14 graminoid species, and 40 forb species) to 113 in 2005 (including one tree species, 15 shrub species, 26 graminoid species, and 71 forb species). This does not mean that so many more species have come in, but rather that the widened riparian zone now encompasses more area with a wider range of hydrologic conditions.

The only tree species observed on Ledford Creek was *Juniperus scopulorum* (Rocky Mountain juniper). The inventoried reaches are willow dominated. The most common shrub species observed were *Salix boothii* (Booth willow), *Salix exigua* (sandbar willow), *Betula occidentalis* (water birch), and *Salix bebbiana* (Bebb willow). The most significant difference in the woody vegetation composition since 1999 is the increased cover of *Salix exigua* (sandbar willow) due to the raised water table and expanded riparian zone, and to the reduced browse utilization level. The reduced browse utilization may be the combined result of management change and decreased accessibility in the greater area flooded by beaver.

The herbaceous layer (graminoids and forbs) is drastically altered from native composition, currently dominated by aggressive invader species (weeds), undesirable disturbance increasers, and exotic grasses introduced for tame pasture.

## **Habitat Type/Community Type**

Half the area of this expanded riparian zone is accounted for by the *Salix geyeriana* (Geyer willow) community type. This community type is a degraded community occupying sites of the *Salix geyeriana* (Geyer willow/beaked sedge) habitat type, where long term, heavy grazing use has displaced the sedges and native grasses by drier, grazing tolerant grasses. Due to the transitional state from what was once a very wet, beaver dominated, site, to a dried and disturbed site with beaver gone, and now back again to a wetted site; the community is very diverse with lots of transitional microsites in vegetative flux. The *Juniperus scopulorum* (Rocky Mountain juniper) plants observed were all young, immature plants in trace amounts.

## **Invasive Species (Weeds)**

Invasive species have increased since 1999. This is a major factor detracting from riparian functional health on Ledford Creek. In 1999 *Cirsium arvense* (Canada thistle) and *Cynoglossum officinale* (common hound's-tongue) were recorded on Ledford Creek in every polygon. These have increased their coverage and have also now been joined by *Cardaria draba* (whitetop), *Tanacetum vulgare* (common tansy), and *Chrysanthemum leucanthemum* (ox-eye daisy). Canada thistle and hound's-tongue are still the two most abundant forb species on Ledford Creek.



## **Browse Evaluation**

Browse utilization continues to be very heavy on all available shrubs. This condition is not much changed from 1999, when all accessible willow plants exhibited the “arrested growth type.” (Figure 5) No determination was made of whether browsing was being done by livestock or wildlife. It is likely that both are responsible.



**Figure 5.** Example of browsed shrubs on Ledford Creek in 2005 showing “arrested growth type”

## **Physical Site Conditions**

Currently, this reach of Ledford Creek is in transition back into a beaver dominated system with a series of dams and ponds spreading water over a wide floodplain lacking a continuous single thread channel. Much of the reach now is still in a Rosgen C5 or C6 channel type, characterized by eroding and depositing along alternate banks of a meandering channel

In 1999 the channel bed was dominated by small cobbles and gravel throughout all polygons. The 2005 data show a shift in dominance to smaller materials on the channel bed. This can also be explained by the readjustment of the large amount of stored sediment associated with a beaver dominated stream system when the beaver do not maintain the dams. In 1999, the beaver dams were mostly all breached and the channel was starting to cut through the sediment piled behind them and down into underlying gravels. The beaver are well on their way now to reestablishing a series of new dams along this stream.

## Health Assessment

In the six years from 1999 to 2005, overall riparian health on Ledford Creek has certainly improved, but the success is a mixed bag. Good gains are recorded on key vegetative factors of overall plant cover of the riparian zone and in regeneration of preferred tree and shrub species, but a major negative continuing to worsen is the invasive weed problem. Good gains have also occurred in the amount of deep, binding rootmass protection of the streambanks, in reducing the amount of human caused bare ground, and in reducing the amount of human caused alteration of the streambanks. However, channel incisement presents a potentially serious problem on Ledford Creek. The incisement is now in early stages, and may only be a transitional result of destabilization due to the movement of large amounts of sediment previously stored behind old beaver dams (Figure 6). The renewed beaver activity that has already helped to positively affect the vegetation aspects of functional health here could also quickly remedy this potentially serious problem, if the beaver are allowed to thrive and are kept from overpopulating the site. Channel incisement is a very serious problem, if allowed to proceed unchecked. It leads to loss of water table availability to vegetation on the floodplain. The extent of incisement at this early stage can be held in check and reversed by relatively inexpensive grazing management change designed to promote healthy woody plant recruitment and maintenance, which will in turn promote continued beaver presence. The beaver are key to the hydrologic conditions that maintain the health of this kind of riparian system.



**Figure 6.** The stream scouring a deep channel through a failing beaver dam

In 1999 the polygon health ratings for Ledford Creek were uniformly low, ranging from 49 percent to 58 percent. There has been some dramatic changes since then, some positive and some negative, but with an overall trend of improvement (Tables 2 and 3). In Table 2 the health rating is broken out by polygon along Ledford Creek, so that

the problem and success areas can be identified to kind and location. Table 3 shows the individual factor items as they were scored with points out of a potential maximum. This gives a precise indication of what items remain problematic and which ones have responded positively to management change.

The change from 1999 to 2005 is shown in detail in Table 3. The answer to each question on the lotic health assessment is compared between the two observations at each polygon. Total vegetation and regeneration of preferred tree and shrub species have improved dramatically, while the presence of invasive plants has negated a lot of those gains on all polygons. Among the physical site questions, we find that the streambank factors of deep, binding rootmass protection and the amount of human caused streambank alteration were significantly improved since 1999, as well as reduction in the amount of human caused bare ground. Only the amount of alteration to areas beyond the streambank and the incipient channel incisement were serious negatives.

**Table 2.** Summary of riparian health change on Ledford Creek by polygon between 1999 and 2005 (Values given in percent ratings, where 100 percent would represent perfect health.) (Polygon 1 is most upstream)

Polygon	Year	Vegetation	Physical	Overall	Overall Category <sup>1</sup>
1	1999	63	53	58	NF
	2005	59	80	70	FAR
2	1999	52	53	53	NF
	2005	63	63	63	FAR
3	1999	44	53	49	NF
	2005	63	73	68	FAR
4	1999	44	60	53	NF
	2005	67	63	65	FAR
5	1999	59	43	51	NF
	2005	63	73	68	FAR
6	1999	63	50	56	NF
	2005	63	67	65	FAR
7	1999	37	60	49	NF
	2005	67	43	54	NF

<sup>1</sup> **Categories:**

PFC (Proper Functioning Condition) = score rating from 80 to 100 percent

FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent

NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

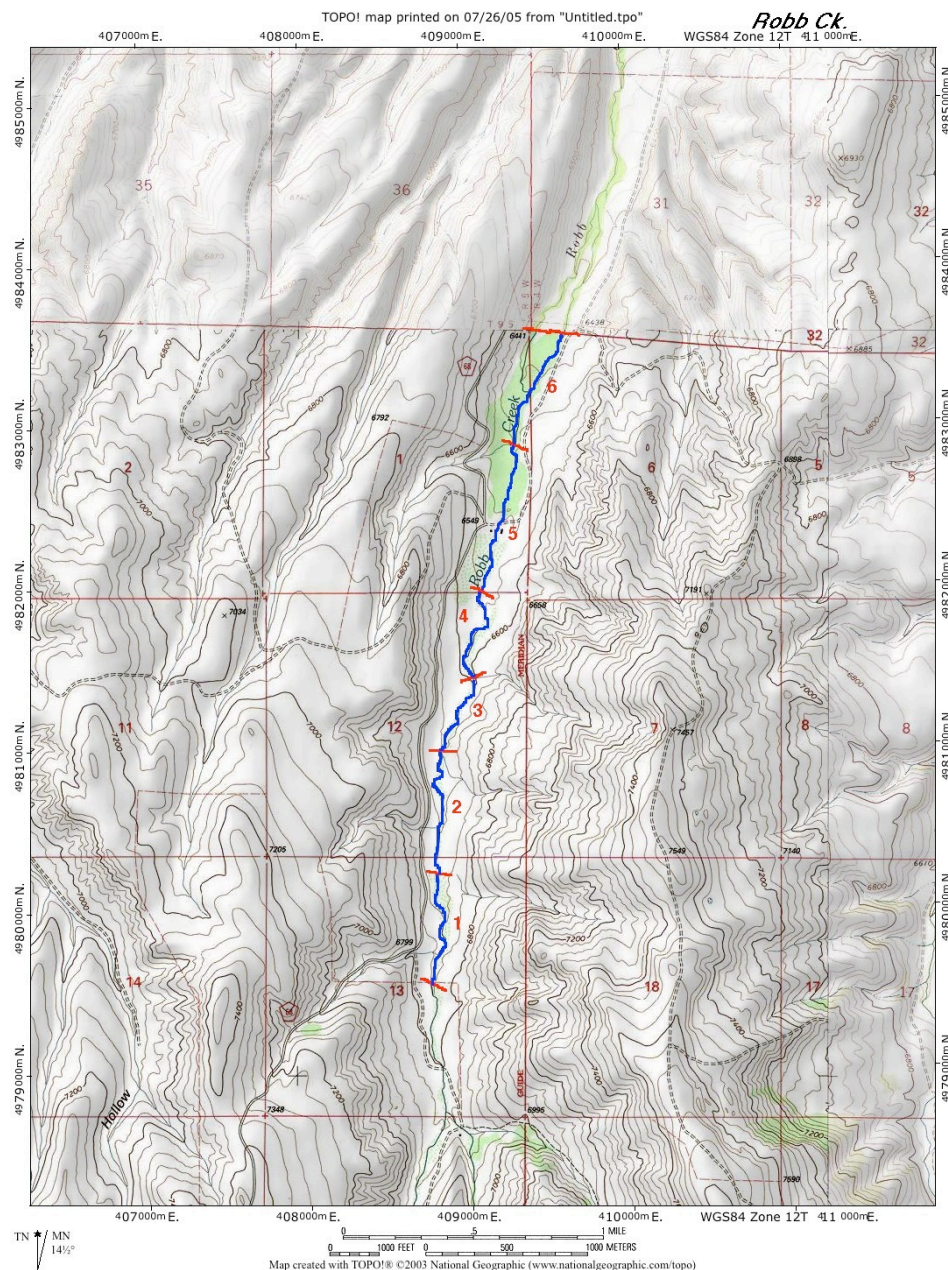


**Table 3.** Breakout of the Ledford Creek health assessment scoring by item and polygon (Polygon 1 is most upstream)

Health Item Question	Item Weight (Full Points)	Year	Ledford Creek Polygon Number						
			1	2	3	4	5	6	7
1. Total Vegetation Cover	6	1999	2	2	2	4	2	2	4
		2005	6	6	6	6	6	6	6
2a, 2b. Invasive Weeds	6	1999	4	4	4	4	4	4	2
		2005	0	1	1	1	1	1	1
3. Undesirable Herbs	3	1999	2	1	2	1	3	2	2
		2005	1	1	2	2	2	2	2
4. Tree & Shrub Regeneration	6	1999	2	2	4	6	6	6	2
		2005	6	6	6	6	6	6	6
5. Tree & Shrub Utilization	3	1999	0	0	0	0	0	0	0
		2005	1	1	0	1	0	0	0
6. Dead & Decadent Wood	3	1999	2	1	2	2	2	2	2
		2005	2	2	2	2	2	2	3
Vegetation Sub Total	27	1999	12	10	14	17	17	16	12
		2005	16	17	17	18	17	17	18
7. Deep, Binding Rootmass	6	1999	2	2	2	2	2	2	0
		2005	6	6	6	6	6	6	2
8. Human Caused Bare Ground	6	1999	2	4	2	2	2	2	4
		2005	6	4	4	4	4	4	4
9. Altered Streambanks	6	1999	0	0	0	0	0	0	2
		2005	4	2	4	2	4	2	2
10. Altered Riparian Zone	3	1999	3	3	3	3	2	0	3
		2005	2	1	2	1	2	2	2
11. Channel Incisement	9	1999	9	9	9	9	9	9	9
		2005	6	6	6	6	6	6	3
Physical Sub Total	30	1999	16	18	16	16	15	13	18
		2005	24	19	22	19	22	20	13
<b>Overall Total</b>	<b>57</b>	<b>1999</b>	<b>28</b>	<b>28</b>	<b>30</b>	<b>33</b>	<b>32</b>	<b>29</b>	<b>30</b>
		<b>2005</b>	<b>40</b>	<b>36</b>	<b>39</b>	<b>37</b>	<b>39</b>	<b>37</b>	<b>31</b>

## SUMMARY OF LOTIC INVENTORY AND HEALTH ASSESSMENT ON ROBB CREEK

In early August of 2005 BRI conducted follow-up lotic riparian inventory on 6 polygons on Robb Creek, a perennial stream in sections 1, 12, and 13 of township 10S, range 5W and section 6 of township 10S, range 4W (Figures 7 and 8). Elevation on this reach of Robb Creek ranges from approximately 6,740 feet at the upper end to approximately 6,440 feet at the lower end. This reach of stream had previously been inventoried six years earlier in 1999 and found to be functional at risk (healthy, but with problems) at that time. Six years later in 2005, this reach of Robb Creek remains on average in the same broad category of health, but has suffered some decline in functional health.



**Figure 7.** Topographic map of Robb Creek showing sampled polygon locations





**Figure 8.** Overview of Robb Creek near the lower end showing split riparian community

Although the same length of stream was inventoried as in 1999 (2.9 miles), the average riparian zone width was estimated much wider in this 2005 latter inventory. The riparian zone areas included in the six polygons on Robb Creek was estimated in 1999 as 16.4 acres. This area in 2005 was estimated at 76.1 acres. The riparian zone width appears to have been underestimated previously, because conditions on the reach are not such as would result in a widening of the wetted area or of the area with riparian vegetation. This reach of Robb Creek has suffered further degradation since 1999, the kind that would result in the narrowing of the riparian zone, not widening. However, Figure 9, taken near the upper end in polygon 1, shows a good perspective of the riparian zone width.



**Figure 9.** View of Robb Creek riparian zone near the upper end showing wide valley bottom

## Vegetation

The total number of plant species observed on the Robb Creek riparian zone has increased since 1999 from 67 (including one tree species, 12 shrub species, 14 graminoid species, and 40 forb species) to 98 in 2005 (including one tree species, 13 shrub species, 27 graminoid species, and 57 forb species). It does not mean that so many more species have come in, but rather that the wider area considered to be the riparian zone now encompasses more area with a wider range of hydrologic conditions and plant diversity.

Approximately 60 percent of the riparian zone within these polygons of Robb Creek is covered by the canopy of willows. The only tree species, *Juniperus scopulorum* (Rocky Mountain juniper), was recorded in every polygon along Robb Creek, accounting for only one percent of the riparian zone area. The largest presence is a patch at the lower end of polygon 5 and upper end of polygon 6. Worth noting is the fact that much of the juniper cover is of younger plants.

In 1999 graminoid cover ranged from 50 to 70 percent on all polygons, but has increased now to range from 70 to 90 percent. However, this graminoid cover is dominated by introduced exotic species. The primary native graminoids present are *Carex rostrata* (beaked sedge) and *Juncus balticus* (Baltic rush). Major exotic graminoids are *Poa pratensis* (Kentucky bluegrass), *Phleum pratense* (common timothy), *Bromus inermis* (smooth brome), and *Agrostis stolonifera* (redtop). Among the large diversity of forb species, the two most abundant are the invasive weeds *Cirsium arvense* (Canada thistle) and *Cynoglossum officinale* (common hounds-tongue), and the remaining long list is dominated by exotic and less than desirable species.

Livestock utilization level was not evenly distributed. Heavy use was recorded this season in polygons 1, 2, and 6; while the middle section (polygons 3, 4, and 5) had been only lightly or not utilized this year at the date of this inventory.

## Habitat Type/Community Type

Most of the Robb Creek riparian zone on this reach is currently occupied by the *Salix geyeriana*/*Carex rostrata* (Geyer's willow/beaked sedge) habitat type, or one of its seral stages. The greatest part of the area is in the *Salix geyeriana* (Geyer's willow) community type, which is a grazing induced seral stage of the *Salix geyeriana*/*Carex rostrata* (Geyer's willow/beaked sedge) habitat type.

## Invasive Species (Weeds)

*Cirsium arvense* (Canada thistle) and *Cynoglossum officinale* (Common Hound's-tongue) were recorded on Robb Creek with significant patches in every polygon. These two invasive species were the two most abundant forbs on this reach of Robb Creek. Since 1999 the additional invasive weed *Cardaria draba* (whitetop) has been recorded on Robb Creek. This occurrence is in the vicinity of the old ranch buildings near the middle of polygon 5.



## Browse Evaluation

The level of shrub browse utilization was unevenly distributed in the same pattern as general forage use. The middle polygons (3, 4, and 5) have recently been used lightly, or not at all, while on the upper end (polygons 1 and 2) and the lowest polygon (number 6) utilization was heavy. The willows exhibited “uninterrupted growth type” only on sites inaccessible to livestock and “released growth type” on much of the middle three polygons. On the more accessible sites most willow plants have “arrested growth type.” Figure 10 shows a willow community in the recently unimpacted polygon 3. Figure 11 shows heavily browsed and trampled willows in polygon 6.



**Figure 10.** Lightly impacted willow community in polygon 3



**Figure 11.** Heavily impacted willows in polygon 6



## Health Assessment

In the six years since 1999, polygon health ratings for Robb Creek remained in the functional, at risk (healthy, but with problems) category, but have declined from the upper end to the middle of its range of 60 to 79 percent.

As on Ledford Creek, Robb Creek shows gains on some factors and declines on others. However, on Ledford Creek, the declines outweigh the gains. Major negative vegetative factors are increased infestation of invasive weeds and in the amount of undesirable herbaceous species cover. Gains were recorded on the physical side of site conditions in increased deep, binding rootmass protection of the streambanks and in a reduced amount of human caused bare ground, but these gains were offset by increased human caused alteration and channel incisement (Figures 12 and 13). As on Ledford Creek, it appears that the extent of incisement at this early stage can readily be held in check and reversed by relatively inexpensive changes in grazing management designed to promote healthy woody plant recruitment and maintenance, which will in turn promote continued beaver presence. The beaver are key to the hydrologic conditions that maintain the health of this kind of riparian system.



**Figure 12.** Human caused alteration in and along the channel of Robb Creek in polygon 6

In 1999 the polygon health ratings for Robb Creek were moderately high, with scores for polygons 3 and 5 falling into the lower range of proper functioning condition (healthy), and the remaining four polygons all scoring in the upper range of functional, at risk (healthy, but with problems) categories. Since 1999 there have been both positive and negative changes, with an overall declining trend (Tables 4 and 5). Only two polygons (2 and 4) held their overall rating score unchanged over this period. Polygon 6 at the lower end fell from 74 percent to 51 percent, dropping it from the upper end of the functional, at risk category to nonfunctional (unhealthy). In Table 4 the health rating is broken out by polygon along Ledford Creek, so that the problem and success areas can be identified to kind and location.





**Figure 13.** Early stages of incisement of blown beaver dam in polygon 6

**Table 4.** Summary of riparian health change on Robb Creek by polygon between 1999 and 2005 (Values given in percent ratings, where 100 percent would represent perfect health.) (Polygon 1 is most upstream)

Polygon	Year	Vegetation	Physical	Overall	Overall Category <sup>1</sup>
1	1999	63	87	75	FAR
	2005	59	77	68	FAR
2	1999	70	93	82	PFC
	2005	59	70	65	FAR
3	1999	63	87	75	FAR
	2005	59	90	77	FAR
4	1999	81	93	88	PFC
	2005	67	90	79	FAR
5	1999	70	87	79	FAR
	2005	63	90	77	FAR
6	1999	67	80	74	FAR
	2005	59	43	51	NF

<sup>1</sup> **Categories:**

PFC (Proper Functioning Condition) = score rating from 80 to 100 percent

FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent

NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

Table 5 shows the individual factor items as they were scored out of a potential maximum. This indicates which items remain problematic and which have responded positively to management change. The change from 1999 to 2005 is shown in detail in Table 5. The result to each question on the lotic health assessment is compared between the two assessments at each polygon. As on Ledford Creek, total vegetation cover improved on all polygons.

Browse utilization and regeneration of preferred tree and shrub species improved marginally, but the presence of invasive weeds and the amount of undesirable herbaceous cover more than offset those gains. Among the physical questions, we found improvement in deep, binding rootmass protection and reduction in human caused bare ground. On the other hand there was increased human caused alteration to both the streambanks and to the polygon outside the banks. However, the most serious physical impairment to riparian health is the increase in channel incisement. This is a major red flag of warning. While this condition is presently still in a stage that can be fairly easily reversed, continued streambed degradation can mean almost complete loss of riparian function when the water table becomes lowered beyond reach of the riparian vegetation on the floodplain. As on Ledford Creek, beaver represent the solution to riparian health on these streams.

### **Physical Site Conditions**

The channel bed is dominated by cobbles and gravel throughout all polygons. The floodplain and banks are primarily silt and clay, with significant sand or gravel. The channel in the upper five polygons is only about 8 to 12 feet wide that alternates between a Rosgen B and C type. Part of polygon 6 is degraded into the incised Rosgen F type that cannot readily escape the banks. Gradient drops from about 2.5 percent at the upper end to about 1.5 percent at the lower end. There is very little lateral cutting of the streambanks due to the dense vegetation cover and excellent deep, binding rootmass in all but a few spots. Human-caused alteration of the channel banks due to livestock trampling damage is a problem only in polygon 6 at the lower end. Only polygon 2 was vertically unstable, with one headcut present. There was very little human-caused bare ground on any polygon. Figure 14 illustrates the lush sedge and willow production that is possible when beaver flood a wider area that livestock find inaccessible due to boggy conditions.



**Figure 14.** Lush sedge and willow production due to beaver maintained high water table

**Table 5.** Breakout of the Robb Creek health assessment scoring by item and polygon (Polygon 1 is most upstream)

Health Item Question	Item Weight (Full Points)	Year	Ledford Creek Polygon Number					
			1	2	3	4	5	6
1. Total Vegetation Cover	6	1999	4	4	4	6	4	4
		2005	6	6	6	6	6	6
2a, 2b. Invasive Weeds	6	1999	4	4	4	4	4	4
		2005	1	1	1	3	1	1
3. Undesirable Herbs	3	1999	2	2	2	2	2	2
		2005	0	0	0	1	0	1
4. Tree & Shrub Regeneration	6	1999	4	6	4	6	6	6
		2005	6	6	6	4	6	6
5. Tree & Shrub Utilization	3	1999	1	1	1	1	1	0
		2005	1	1	2	2	2	0
6. Dead & Decadent Wood	3	1999	2	2	2	3	2	2
		2005	2	2	2	2	2	2
Vegetation Sub Total	27	1999	17	19	17	22	19	18
		2005	16	16	17	18	17	16
7. Deep, Binding Rootmass	6	1999	4	6	4	6	4	4
		2005	6	4	6	6	6	4
8. Human Caused Bare Ground	6	1999	4	4	4	4	4	4
		2005	4	4	6	6	6	4
9. Altered Streambanks	6	1999	6	6	6	6	6	4
		2005	6	6	6	6	6	2
10. Altered Riparian Zone	3	1999	3	3	3	3	3	3
		2005	1	1	3	3	3	0
11. Channel Incisement	9	1999	9	9	9	9	9	9
		2005	6	6	6	6	6	3
Physical Sub Total	30	1999	26	28	26	28	26	24
		2005	23	21	27	27	27	13
<b>Overall Total</b>	<b>57</b>	<b>1999</b>	<b>43</b>	<b>47</b>	<b>43</b>	<b>50</b>	<b>45</b>	<b>42</b>
		<b>2005</b>	<b>39</b>	<b>37</b>	<b>44</b>	<b>45</b>	<b>44</b>	<b>29</b>